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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,953	01/16/2004	Kiyoshi Satoh	ASMJP.055DV1	8185
20995	7590	05/18/2006	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			ALEJANDRO MULERO, LUZ L	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/759,953	Applicant(s) SATO ET AL.	
	Examiner Luz L. Alejandro	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-19 and 45 is/are pending in the application.
- 4a) Of the above claim(s) 11-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-10, 14-19, 45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0406</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/27/06 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-6 and 8-10 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shang et al., EP 0 697 467 in view of Igarashi et al., U.S. Patent 5,031,571 and Iyer et al., U.S. Patent 6,498,109 and Yin et al., WO 99/20812 or Fong et al., US 5,812,403, or Fong et al., US 5,939,831, or Sun et al., US 2002/0033183 or Fukuda et al., US 2005/0139578.

Shang et al. shows the invention substantially as claimed including a chemical vapor deposition device comprising: a deposition reaction chamber 10; a plasma discharge chamber 46 that is provided remotely from the reaction chamber; wherein the

plasma discharge chamber includes a capacitively coupled RF plasma source and comprises a source of cleaning gas 44, wherein the source of cleaning gas is connected to the plasma discharge chamber; and a stainless steel piping 57 that links the reaction chamber and the remote plasma discharge chamber, wherein energy coupled to the remote plasma discharge chamber activates cleaning gas within the plasma discharge chamber, and the activated cleaning gas is brought into the inside of the reaction chamber through the piping and changes solid substances adhered to the inside of the reaction chamber as a consequence of film formation, to gaseous substances, thereby cleaning the inside of the reaction chamber, wherein internal surfaces of the piping comprises stainless steel not corroded by the activated cleaning gas species (see fig. 1 and its description).

Shang et al. does not expressly disclose a wall of the plasma discharge chamber that is made of an aluminum alloy, wherein the wall is exposed to plasma discharge, and the plasma discharge chamber including a radio frequency energy source connected to plasma discharge chamber electrodes, wherein the RF energy source operates at a frequency between about 300 kHz and about 500 kHz and a power between 50 watts to 5 kilowatts. Igarashi et al. discloses a capacitively coupled RF plasma power source including plasma discharge chamber electrodes 10,20 with an exposed aluminum alloy chamber 30 (see fig. 1 and its description, and col. 3-lines 59-66). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shang et al. so as to include the capacitively coupled structure of Igarashi et al. for the plasma discharge

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chamber because this is shown to be a suitable means in which to energize gas into plasma.

Shang et al. and Igarashi et al. do not expressly disclose wherein the RF energy source operates at a frequency between about 300 kHz and about 500 kHz. Iyer et al. teaches a plasma processing apparatus (see fig. 1) including a remote plasma discharge 12 coupled to a plasma energy source 28, wherein the plasma energy source may be a pair of oppositely placed electrodes in order to create reactive species where the frequency can range from 10 KHz to 200 MHz (see col. 3-lines 24-60). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shang et al. modified by Igarashi et al. so as to have electrodes of the plasma discharge chamber operating at the frequencies disclosed by Iyer because these frequencies are shown to be suitable for creating reactive species.

Shang et al., Igarashi et al. and Iyer et al. do not expressly disclose the claimed valve positioned in the piping that links the reaction chamber and the remote plasma discharge chamber. Yin et al. discloses an apparatus comprising a valve 225 positioned between a remote plasma chamber 40 and a reaction chamber, wherein the valve has an opening that, when fully open, defines a pressure drop across the valve of less than about 0.25 Torr (see, for example, fig. 4 and its description). Additionally, Fong et al. '403 and Fong et al. '831 disclose an apparatus comprising a valve 280 positioned between a remote plasma chamber 55 and a reaction chamber, wherein the valve has an opening that, when fully open, defines a pressure drop across the valve of

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less than about 0.25 Torr (see, for example, fig. 1 and its description). Also, Sun et al., discloses an apparatus comprising a valve 62 positioned between a remote plasma chamber 50 and a reaction chamber, wherein the valve has an opening that, when fully open, defines a pressure drop across the valve of less than about 0.25 Torr (see, for example, fig. 1 and its description). Furthermore, Fukuda et al., discloses an apparatus comprising a valve 15 positioned between a remote plasma chamber 16 and a reaction chamber, wherein the valve has an opening that, when fully open, defines a pressure drop across the valve of less than about 0.25 Torr (see, for example, fig. 2 and its description). Therefore, in view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shang et al. modified by Igarashi et al. and Iyer et al. to further comprise a valve positioned in the piping between the reaction chamber and the remote plasma chamber, as taught by Yin et al., or Fong et al. '403, or Fong et al. '831, or Sun et al., or Fukuda et al., in order to regulate the rate of introduction of activated gas into the treating chamber.

With respect to the piping being fluorine passivated, note that the presence of the fluorine cleaning gas will passivate the stainless steel piping with fluoroine.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shang et al., EP 0 697 467 in view of Igarashi et al., U.S. Patent 5,031,571 and Iyer et al., U.S. Patent 6,498,109, and Yin et al., WO 99/20812 or Fong et al., US 5,812,403, or Fong et al., US 5,939,831, or Sun et al., US 2002/0033183 or Fukuda et al., US 2005/0139578,

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as applied to claims 1-3, 5-6 and 8-10 and 14-16 above, and further in view of Li et al., U.S. Patent 6,143,084.

Shang et al., Igarashi et al., Iyer et al., Yin et al., Fong et al. '403, Fong et al. '831, Sun et al. and Fukuda et al. are applied as above but do not expressly disclose fluoroine passivated aluminum or aluminum alloy piping. Li et al. discloses using aluminum piping 116 in a plasma apparatus (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shang et al. modified by Igarashi et al. and Iyer et al. and Yin et al. or Fong et al. '403 or Fong et al. '831 or Sun et al. or Fukuda et al., so as to have the pipes made of aluminum because Li et al. shows that aluminum piping is suitable to be used in a plasma apparatus.

With respect to the piping being fluorine passivated, note that the presence of the fluorine cleaning gas will passivate the aluminum piping with fluoroine.

Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shang et al., EP 0 697 467 in view of Igarashi et al., U.S. Patent 5,031,571 and Iyer et al., U.S. Patent 6,498,109, and Yin et al., WO 99/20812 or Fong et al., US 5,812,403, or Fong et al., US 5,939,831, or Sun et al., US 2002/0033183 or Fukuda et al., US 2005/0139578, as applied to claims 1-3, 5-6 and 8-10 and 14-16 above, and further in view of Noble et al., U.S. Patent 6,450,116.

Shang et al., Igarashi et al., Iyer et al., Yin et al., Fong et al. '403, Fong et al. '831, Sun et al. and Fukuda et al. are applied as above but do not expressly disclose a

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reaction gas inlet and outlet defining a horizontal flow across a substrate surface upon which material is deposited within the reaction chamber, wherein the piping opens into the reaction chamber downstream of the inlet and upstream of a substrate support configured for supporting a substrate within the chamber, and wherein the reaction chamber comprises quartz walls and radiant heating elements. Noble et al. disclose a process gas entering into the reaction chamber 213 from the inlet 214 and passing over the substrate 100 in the reaction chamber and being exhausted via 253 (see fig. 3A and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shang et al. modified by Igarashi et al. and Iyer et al. and Yin et al. or Fong et al. '403 or Fong et al. '831 or Sun et al. or Fukuda et al. so as to include the gas inlet/outlet structure of Noble et al. because such a structure is shown to be a suitable means in which to introduce and remove gas from a plasma processing chamber.

Concerning the quartz walls and the radiant heating elements, Noble et al. includes light pipe assembly 218 including lamps 219 disposed between quartz plates 247,248 (see col. 7-line 59 to col. 8-line 36). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shang et al. modified by Igarashi et al. and Iyer et al. and Yin et al. or Fong et al. '403 or Fong et al. '831 or Sun et al. or Fukuda et al., so as to include the quartz plates and radiant heating elements because this will allow for the apparatus to be capable of conducting processing at elevated temperatures.

With respect to the piping being at least ½ inch in diameter, a prima facie case of obviousness still exists because it would have been obvious to one of ordinary skill in the art to optimize the diameter of the piping during routine experimentation depending upon, for example, the desired flow of activated gas, and would not lend patentability to the instant application absent the showing of unexpected results. Additionally, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shang et al., EP 0 697 467 in view of Igarashi et al., U.S. Patent 5,031,571 and Iyer et al., U.S. Patent 6,498,109, and Yin et al., WO 99/20812 or Fong et al., US 5,812,403, or Fong et al., US 5,939,831, or Sun et al., US 2002/0033183 or Fukuda et al., US 2005/0139578, as applied to claims 1-3, 5-6 and 8-10 and 14-16 above, and further in view of Ikeda et al., U.S. Patent 5,520,142.

Shang et al., Igarashi et al., Iyer et al., Yin et al., Fong et al. '403, Fong et al. '831, Sun et al. and Fukuda et al. are applied as above but do not expressly disclose wherein the wall is anodized. Ikeda et al. discloses forming a chamber wall of aluminum and anodizing the exposed portion in the plasma chamber (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shang et

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al. modified by Igarashi et al. and Iyer et al. and Yin et al. or Fong et al. '403 or Fong et al. '831 or Sun et al. or Fukuda et al., so as to have an anodized inner wall because Ikeda et al. shows this to be a suitable treatment to be done to a wall of a plasma chamber.

Response to Arguments

Applicant's arguments with respect to claims 1-6, 8-10, 14-19 and 45 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro
Primary Examiner
Art Unit 1763

May 15, 2006